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Cc: Licata, Angela[AngelaL@dep.nyc.gov]; 'Mayo, Joseph'[MayoJJ@cdmsmith.com]; 'Roberts, Keegan'[robertsk@cdmsmith.com]; 'Mathew, Rooni'[RMathew@moffatnichol.com]; 'Heineman, Mitchell'[HeinemanMC@cdmsmith.com]; Schmidt, Mark[schmidt.mark@epa.gov]; Vaughn, Stephanie[Vaughn.Stephane@epa.gov]
From: Weissbard, Ron
Sent: Fri 3/17/2017 3:50:15 PM
Subject: RE: InfoWork Rainfall information
[Rainfall sensitivity summary.xlsx](#)

Caroline, here is a response from the LTCP team. Let me know if you need any other information.

The calibration of the Infoworks model was based on 5-minute gauge-adjusted radar rainfall data, for LTCP analysis (output flows) the NYSDEC-accepted method uses the hourly data. Further decomposing does not make a significant difference.

The attached table presents the results of sensitivity runs conducted to assess the impact of running the InfoWorks model with 1-hour, 15-minute, and 5-minute rainfall data. For the sensitivity runs, the 2008 ASOs preliminary 1-minute data was taken from JFK, and aggregated into 1-hour, 15-minute and 5-minute data. For the comparisons, the geo-neutral existing conditions was used model. Also presented in the table are the annual results for that same model run with the 1-hour JFK rainfall data that is used for the LTCP evaluations. The 1-hour LTCP rainfall is a different data set from the ASO 1-minute data, and the total annual rainfall is different (see the footnotes in the table).

As indicated in the table, the 15-minute rainfall resulted in a 5.7% increase in annual volume and two additional activations at the most active CSO compared to the 1-hour rainfall. The 5-minute data resulted in a 4.4% increase in volume and two additional activations at the most active CSO compared to the 1-hour rainfall (interestingly, the total volume from the 5-minute data was less than the total volume from the 15-minute data). Based on experience in modeling for the previously-submitted LTCPs, these differences in volumes/activations do not significantly affect the evaluations of CSO control alternatives.

The results based on the LTCP JFK 1-hour data are provided for informational purposes, but are not directly comparable to the three runs based on the ASO rainfall, since the total rainfall amounts are different.

In the InfoWorks model, the time-varying parameters include rainfall and tide, along with some minor I/I flows into the system. For the LTCP analyses, 1-hour rain and 1-hour tide data is used.

As stated, the calibration of the Infoworks model was based on 5-minute gauge-adjusted radar rainfall data.

Please let us know if you have any questions on this material, or would like any further analysis.

Thanks

Ron Weissbard, P.E./Acting Director of Superfund

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From: Weissbard, Ron

Sent: Thursday, March 02, 2017 4:37 PM

To: 'Kwan, Caroline' <kwan.caroline@epa.gov>; Mahoney, Keith <kmahoney@dep.nyc.gov>

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Subject: RE: InfoWork Rainfall information

Caroline,

We have our modeling team looking into this and expect to have a detailed response in a couple of weeks. Will keep you updated if there are any developments.

Thanks

Ron Weissbard, P.E./Acting Director of Superfund

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From: Kwan, Caroline [<mailto:kwane@epa.gov>]
Sent: Wednesday, March 01, 2017 4:04 PM
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Subject: InfoWork Rainfall information

Hi Keith,

Regarding our review of the Anchor QEA InfoWorks model, one item that we wanted to discuss before the typical year discussion was cut off at the 2/16/17 LTCP meeting was representation of short-duration precipitation variability. We expect that you've calibrated your collection system model to 5- or 15-minute data. Our experience is that a model should be applied with the same temporal resolution at which it was calibrated; using a longer timestep will otherwise underestimate peak runoff and thus CSO. Raw 1-minute precipitation data is available for JFK for 2008 from the ASOS system, e.g. <ftp.ncdc.noaa.gov/pub/data/asos-onemin/6406-2008/64060KJFK200809.dat> . Do your simulations use these data or otherwise decompose the hourly data into shorter time intervals? Alternatively, the hourly data can be synthetically disaggregated and adjusted to ensure appropriate short-duration peaks.

For example, the table below shows hourly and 1-minute data for September 2008 at JFK. The 1-minute data is missing part of the storm on 9/12 (0.31" instead of 0.63"), but matches the hourly otherwise. One can identify 15-minute peaks within the data. The hourly maxima are generally larger than those from the hourly data (e.g. 1.13" in the peak 60 minutes during Tropical Storm Hanna on Sep 6 vs. 0.76" from the hourly dataset). The difference is much smaller for 2-hour maxima, but short duration spikes often determine CSO discharge rates.

Hourly data

1-minute data

| Depth | Date | | Depth | Date | Event |
|-------|------------------|---|-------|------------------|-------|
| 2.89 | 9/6/08 0:00 | 1 | 2.89 | 9/5/08 23:19 | 1 |
| 2.21 | 9/25/08 20:00 | 4 | 2.21 | 9/25/08 19:45 | 4 |
| 0.77 | 9/9/08 11:00 | 2 | 0.77 | 9/9/08 10:36 | 2 |
| 0.63 | 9/12/08 15:00 | 3 | 0.31 | 9/12/08 16:19 | 3 |
| 0.17 | 9/28/08 12:00 | 6 | 0.17 | 9/28/08 11:10 | 6 |
| 0.07 | 09/27/2008 11:00 | 5 | 0.07 | 09/27/2008 10:59 | 5 |

LARGEST 0.25-HOUR DURATION
TOTALS

| Total | Date | Event |
|-------|---------------|-------|
| 0.51 | 9/9/08 10:45 | 2 |
| 0.47 | 9/6/08 16:04 | 1 |
| 0.21 | 9/26/08 4:45 | 4 |
| 0.09 | 9/28/08 11:10 | 6 |
| 0.08 | 9/12/08 16:19 | 3 |
| 0.03 | 9/27/08 10:59 | 5 |

LARGEST 1.00-HOUR DURATION LARGEST 1.00-HOUR DURATION
TOTALS TOTALS

| Total | Date | Event | Total | Date | Event |
|-------|---------------|-------|-------|---------------|-------|
| 0.76 | 9/6/08 16:00 | 1 | 1.13 | 9/6/08 15:24 | 1 |
| 0.55 | 9/9/08 11:00 | 2 | 0.72 | 9/9/08 10:36 | 2 |
| 0.47 | 9/26/08 3:00 | 4 | 0.49 | 9/26/08 4:32 | 4 |
| 0.19 | 9/12/08 17:00 | 3 | 0.16 | 9/12/08 16:19 | 3 |
| 0.10 | 9/28/08 12:00 | 6 | 0.10 | 9/28/08 11:10 | 6 |
| 0.04 | 9/27/08 12:00 | 5 | 0.05 | 9/27/08 10:59 | 5 |

LARGEST 2.00-HOUR DURATION LARGEST 2.00-HOUR DURATION
TOTALS TOTALS

| Total | Date | Event | Total | Date | Event |
|-------|---------------|-------|-------|---------------|-------|
| 1.30 | 9/6/08 16:00 | 1 | 1.35 | 9/6/08 14:30 | 1 |
| 0.74 | 9/26/08 2:00 | 4 | 0.75 | 9/9/08 10:36 | 2 |
| 0.74 | 9/9/08 11:00 | 2 | 0.75 | 9/26/08 0:59 | 4 |
| 0.33 | 9/12/08 16:00 | 3 | 0.25 | 9/12/08 16:22 | 3 |
| 0.10 | 9/28/08 12:00 | 6 | 0.10 | 9/28/08 11:10 | 6 |
| 0.05 | 9/27/08 11:00 | 5 | 0.05 | 9/27/08 10:59 | 5 |

Thank you. Your prompt response is requested so we can continue to review the models provided in the draft RI report.

Caroline

Caroline Kwan

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